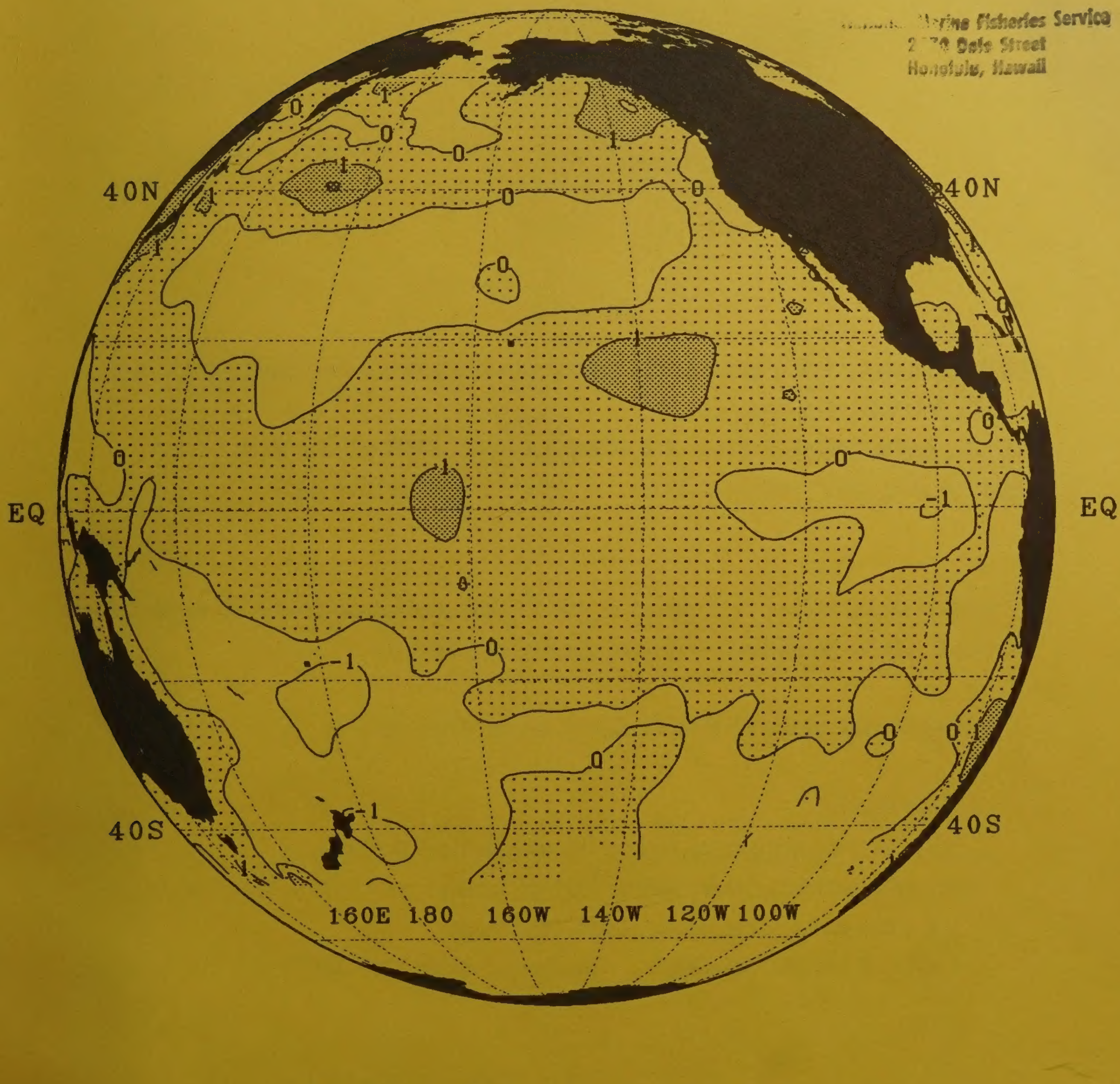
気象庁海洋月報

Monthly Ocean Report

July 1994 (No. 19)



El Niño Monitoring Center
Japan Meteorological Agency

気象庁海洋気象部海洋課
エルニーニョ監視センター

平成6年7月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで作成されています。
本月報に関する問い合わせは、
〒100 東京都千代田区大手町 1-3-4 気象庁エルニーニョ監視センターまで。
電話 03-3212-8341（内線5134, 5135） ファクシミリ 03-3211-3047

Monthly Ocean Report is prepared by the El Niño Monitoring Center, Oceanographical Division, Marine Department, Japan Meteorological Agency.

Correspondence relating to this report may be directed to:

Kunio Sakurai
Head, El Niño Monitoring Center, Oceanographical Division
Marine Department, Japan Meteorological Agency
1-3-4 Ote-machi, Chiyoda-ku, Tokyo 100, Japan
E-mail: K.SAKURAI.JMA/OMNET Facsimile: +81-3-3211-3047

表紙は1994年７月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for July 1994 in the Pacific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（１９９４年７月）

太平洋の海況

太平洋赤道域の海面水温は、160°Ｅから140°Ｗにかけて平年より0.5℃以上高かった。一方、ペルーの沖合で平年より0.5℃以上低い状態が続いていた。エルニーニョ監視海域（4°Ｓ～4°Ｎ、150°Ｗ～90°Ｗ）の海面水温偏差は、-0.1℃だった（第１表、第１図、第６図）。

赤道域表層の28℃以上の暖水層は170°Ｗ以西で厚く、また、160°Ｅから日付変更線にかけて先月より厚さを増し、90ｍ前後に達した（第３図）。

気象庁の海洋気象観測船「凌風丸」は、7月上旬～8月中旬に日本の南岸からニューギニア島北岸までの34°Ｎ・137°Ｅ、7°Ｎ・137°Ｅ、2°Ｎ・142°Ｅ、3°Ｓ・142°Ｅを結ぶ線に沿って海洋観測を実施した。その結果、赤道付近から2°Ｎにかけての28℃以上の暖水層の厚さは昨年に比べて厚く、1°Ｎ付近で80ｍに達していた。また、15°Ｎ付近の暖水層も昨年に比べて厚く、100ｍに達していた（図Ａ）。

北太平洋では、40°Ｎ帯の160°Ｅから日付変更線にかけて平年より1～2℃高かった。また、15°Ｎに沿って145°Ｗから130°Ｗにかけてとアラスカ湾沖では平年より1℃以上高い状態が続いていた（第１図）。

日本近海の海況

日本近海は、全般に平年より1℃以上高く、特に、東シナ海では平年より2℃以上高かった（第17図）。

黒潮は日本の南岸に沿ってほぼ直進し、房総半島沖を東に流れていた（第20図）。

本州東方の親潮系の冷水（深さ100ｍで5℃以下）は、沿岸寄りの分枝は38.5°Ｎ・143.0°Ｅまで、沖合の分枝は39.3°Ｎ・146.0°Ｅまで、それぞれ達していた（第19図）。

熱帯の気象

西部熱帯太平洋の対流活動活発域は、平年の位置であるフィリピン付近にあり、活動は10°Ｎ～20°Ｎで強く、赤道付近で弱かった。インド洋のモンスーン循環は平年より強かった。北半球の亜熱帯高気圧は北に偏って40°Ｎ付近で強かった。南方振動指数（ＳＯＩ）は-1.6と大きな負の値となった（第１表、第12図、第13図）。

［気象庁長期予報課提供］

HIGHLIGHTS July 1994

Pacific

Sea surface temperatures (SSTs) in the equatorial Pacific were more than 0.5°C above normal between 160°E and 140°W. SSTs continued to be more than 0.5°C below normal off Peru. The SST index for region B (Fig. 6) was -0.1°C (Table 1 and Figs. 1 and 6).

Surface warm water (above 28°C) along the equator was thickest between 160°E and 180°E. The thickness there has increased to 90 m since last month (Fig. 3).

Hydrographic observations were made by R/V Ryofu Maru of the JMA along the line connecting (34°N,137°E), (7°N,137°E), (2°N,142°E), and (3°S,142°E) from July to August. The thickness of the surface warm water (above 28°C) from the equator to 2°N was thicker than that of last year, reaching about 80 m around 1°N. The thickness around 15°N reached about 100 m (Fig.A).

In the North Pacific, SSTs were more than 1-2°C above normal along 40°N from 160°E to 180°E. SSTs along 15°N from 145°W to 130°W and off the Gulf of Alaska continued to be more than 1°C above normal (Fig. 1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were more than 1°C above normal. SSTs were notably more than 2°C above normal East China Sea (Fig. 17).

The Kuroshio flowed straight along the south coast of Japan, then flowed eastward off the Boso Peninsula (Fig. 20).

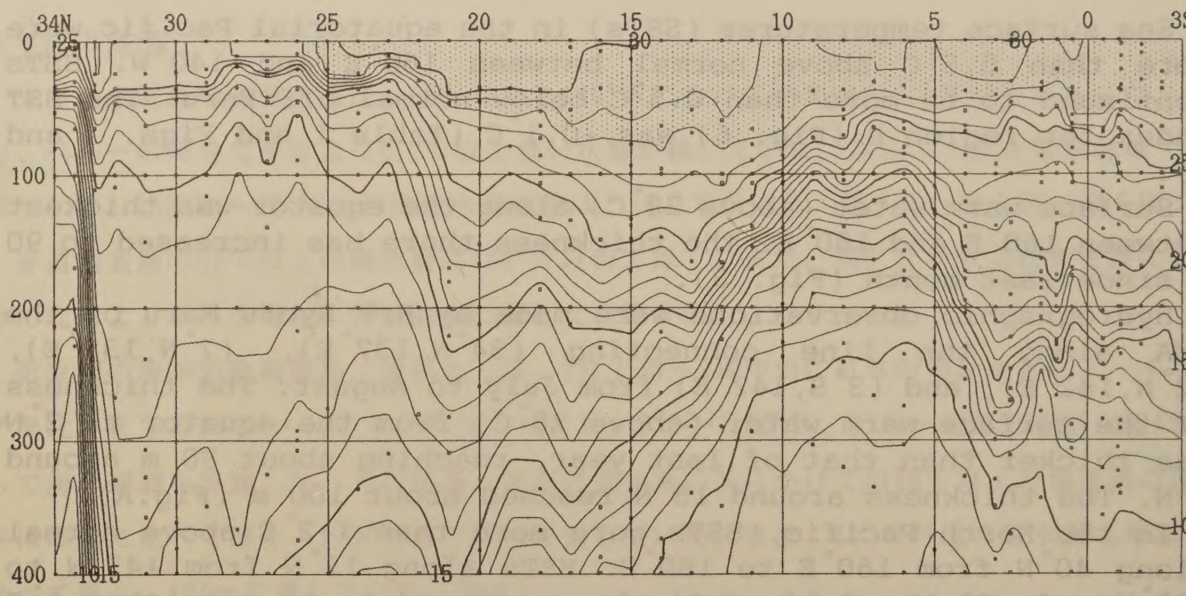
The Oyashio cold water (below 5°C at a 100m depth) extended southward to 38.5°N, 143.0°E and 39.3°N, 146.0°E, respectively (Fig. 19).

Atmospheric conditions in the tropics

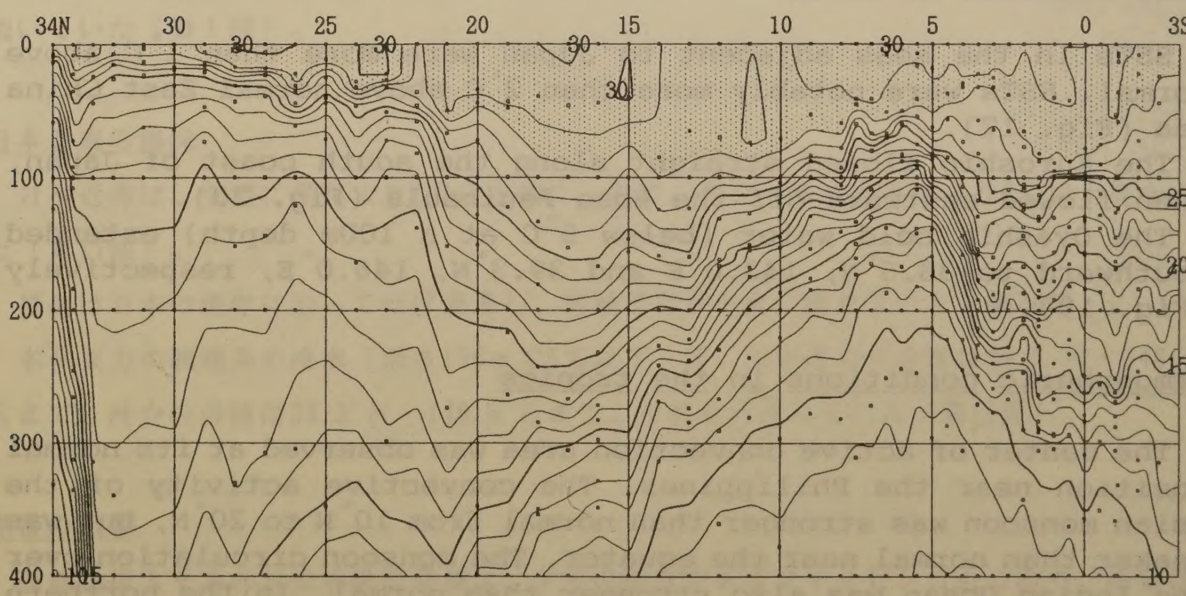
The center of active convection area was observed at its normal position near the Philippines. The convective activity of the Asian monsoon was stronger than normal from 10°N to 20°N, but was weaker than normal near the equator. The monsoon circulation over the Indian Ocean was also stronger than normal. In the northern hemisphere, subtropical highs were strong near 40°N. The SOI was extremely negative (-1.6) (Table 1 and Figs. 12 and 13).

[prepared by the Long-range Forecast Division, JMA]

Depth-Latitude Section of Temperature along 137°E



July−August 1994



July 1993

図－A　137°Eに沿う表層水温断面図（℃）。陰影部は28℃以上の暖水を示す。
［上：1994年7～8月、観測は34° N・137° E、7° N・137° E、2° N・142° E、
3° S・142° Eを結ぶ線に沿って実施
下：1993年7月、観測は34° N・137° E、3° N・137° E、ラバウル（4° 12' S, 152° 11' E）
を結ぶ線に沿って実施］

Fig. A　Depth-latitude section of ocean temperature along 137°E. The contour interval is 1°C with spotted shading for values greater than 28°C.
[top:observations were made for July～August 1994 along the line connecting (34°N, 137°E), (7°N, 137°E), (2°N, 142°E), and (3°S, 142°E).
bottom:observations were made in July 1993 along the line connecting (34°N, 137°E), (3°N, 137°E), and RABAUL (4°12'S, 152°11'E).]

Date	1993											1994					
	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
Pacific Sea Surface Temperature (℃)																		
D (14N～ Eq.) (130E～150E)	28.0	28.2	28.6	28.8	29.2	29.1	28.9	29.1	29.1	29.5	29.1	28.4	28.5	28.6	29.1	29.4	29.6	29.2
	-0.3	-0.2	-0.2	-0.3	-0.1	-0.1	-0.2	-0.1	-0.2	+0.3	+0.2	-0.1	+0.2	+0.2	+0.3	+0.3	+0.3	0.0
A (4N～ 4S) (160E～150W)	28.4	28.4	28.7	29.0	29.1	29.1	28.8	29.1	28.8	28.9	28.7	28.2	28.0	28.2	28.4	28.9	29.0	29.2
	+0.4	+0.3	+0.5	+0.5	+0.6	+0.6	+0.4	+0.8	+0.4	+0.5	+0.5	+0.2	0.0	+0.1	+0.2	+0.4	+0.5	+0.7
B (4N～ 4S) (150W～ 90W)	26.6	27.4	28.1	28.0	27.0	25.8	24.9	24.8	25.0	25.2	25.3	25.7	26.1	26.9	27.0	26.8	26.3	25.1
	+0.4	+0.5	+1.0	+1.4	+0.9	+0.6	+0.3	+0.2	+0.4	+0.6	+0.4	+0.3	-0.1	0.0	-0.1	+0.2	+0.2	-0.1
C (Eq.～ 10S) (90W～ 80W)	26.1	27.0	26.4	25.2	23.3	22.1	21.0	20.8	21.3	21.5	22.8	24.7	26.0	25.3	24.2	23.4	22.2	21.2
	+0.4	+1.1	+1.3	+1.3	+0.6	+0.5	+0.4	+0.5	+0.6	0.0	+0.2	+0.4	+0.3	-0.6	-0.9	-0.5	-0.5	-0.4
Pacific Sea Level Anomaly (cm)																		
YAP (10N, 138E)	9	11	1	-2	-2	1	-1	5	8	8	10	7	7	6	2	2	7	
RABAUL (4S, 152E)	-10	-14	-12	-13	-11	-8	-9	-7	-6	-5	-2	-1	3	4	5	3	1	
MAJURO (7N, 171E)	-4	-4	-8	-1	6	5	3	1	5	2	3	2	2	3	5	1	-2	
TARAWA (1N, 173E)	7	10	3	5	6	4	7	4	6	2	1	6	-1	6	6	7	6	
CHRISTMAS (2N, 157W)	4	8	6	5	-1	-2	-1	-1	-2	-1	-7	-3	-7	0	0	1	1	
SANTA CRUZ (1S, 90W)	8	7	7	10	4	0	0	1	3	0	0	-1	0	-4	-8	-3	1	

第１表（a）エルニーニョ監視指数

Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii for the sea level anomaly.

Date	1993											1994						
	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
Southern Oscillation Index																		
SOI (TAHITI-DARWIN)	-0.6	-0.5	-1.9	-0.8	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2	-0.2	0.1	-0.8	-2.1	-1.4	-1.0	-1.6
TAHITI (17.5S, 150W)	-1.9	1.0	-0.7	0.2	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0	-0.1	0.0	-0.1	-1.5	-0.8	-0.9	-1.5
DARWIN (12.5S, 131E)	-0.3	2.4	1.9	1.4	1.3	0.4	2.2	1.4	1.3	0.1	-0.5	0.3	-0.2	1.7	1.2	1.0	0.3	1.0
High Cloud Amount Index																		
HCLD-PH (20N ～ 10N) (110E ～ 140E)	-0.3	-0.4	-0.5	-2.2	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2	-0.5	-0.5	0.6	0.7	0.2	-0.3	3.5
HCLD-MC (5N ～ 5S) (110E ～ 135E)	-0.9	-1.1	0.3	-1.4	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2	-0.4	-0.5	0.8	0.4	0.4	-1.0	-1.1
HCLD-DL (5N ～ 5S) (170E ～ 170W)	1.4	0.5	2.8	2.0	1.8	1.3	0.3	1.8	1.7	-0.2	0.0	0.0	-0.7	-0.6	0.4	-0.3	-0.3	-0.5
Equatorial Zonal Wind Index																		
U200-IN (5N ～ 5S) (80E ～ 100E)	0.8	-0.9	-0.3	0.5	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8	-0.4	-0.8	-1.5	-0.2	-0.3	-0.5	-1.2
U200-CP (5N ～ 5S) (180 ～ 125W)	-0.3	0.0	-0.6	-1.3	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4	0.4	0.8	0.2	-0.3	-0.5	-0.7	0.4
U850-WP (5N ～ 5S) (160E ～ 175W)	0.9	0.3	0.8	0.5	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7	-1.2	-1.0	-0.6	-0.5	-0.3	-0.4	0.1
U850-CP (5N ～ 5S) (170W ～ 135W)	0.0	-0.1	0.3	0.6	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5	-0.6	-0.9	-0.2	-0.4	0.2	-0.6	-0.1
U850-EP (5N ～ 5S) (130W ～ 100W)	-0.1	0.2	0.5	0.9	0.7	-0.4	0.8	1.0	0.2	0.9	0.2	0.1	-0.4	0.1	-0.5	0.0	-0.5	-1.3

第１表（b）エルニーニョ監視指数(続き)

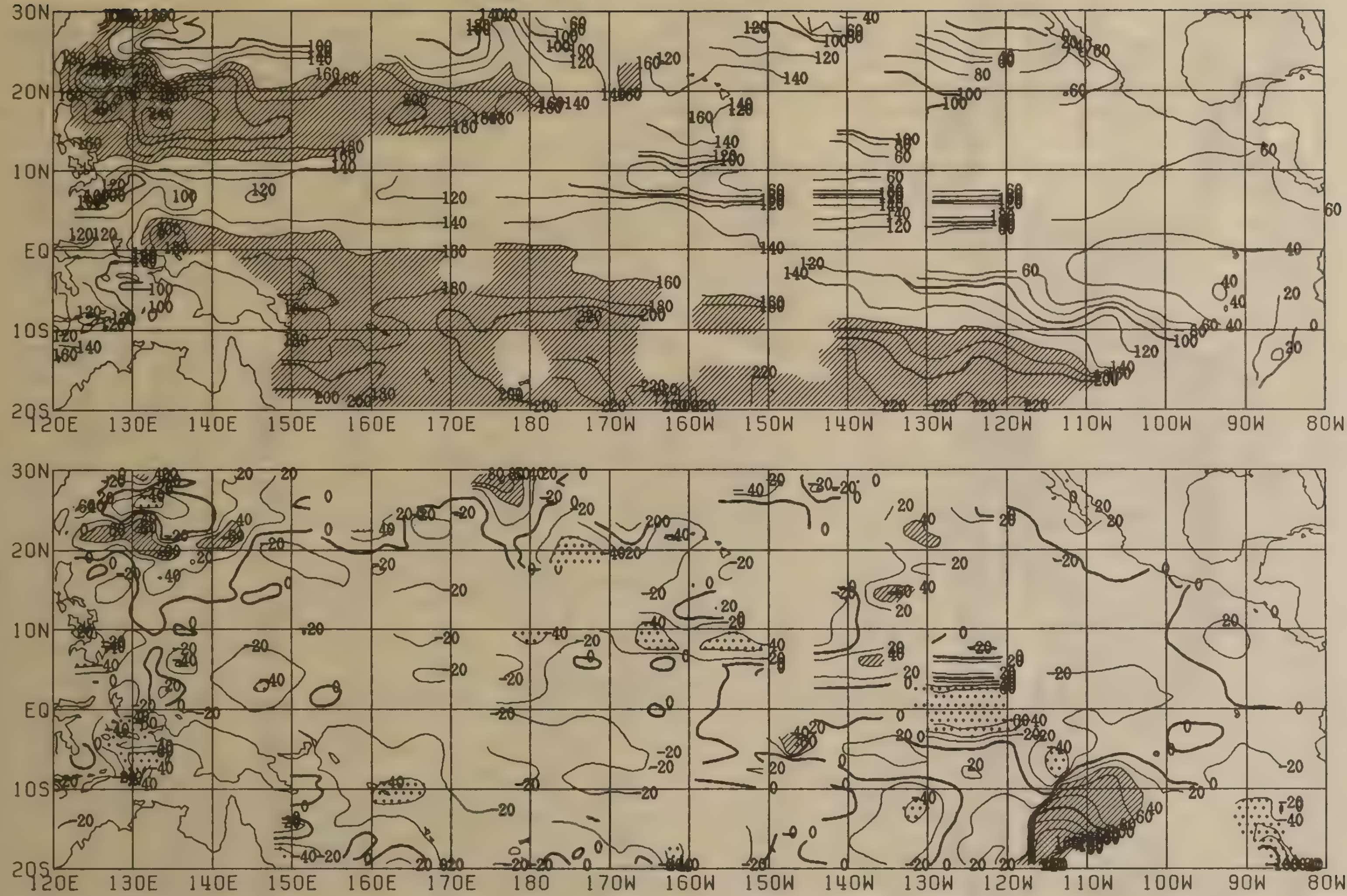
Table 1(b) El Niño monitoring indices (continued).
Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.



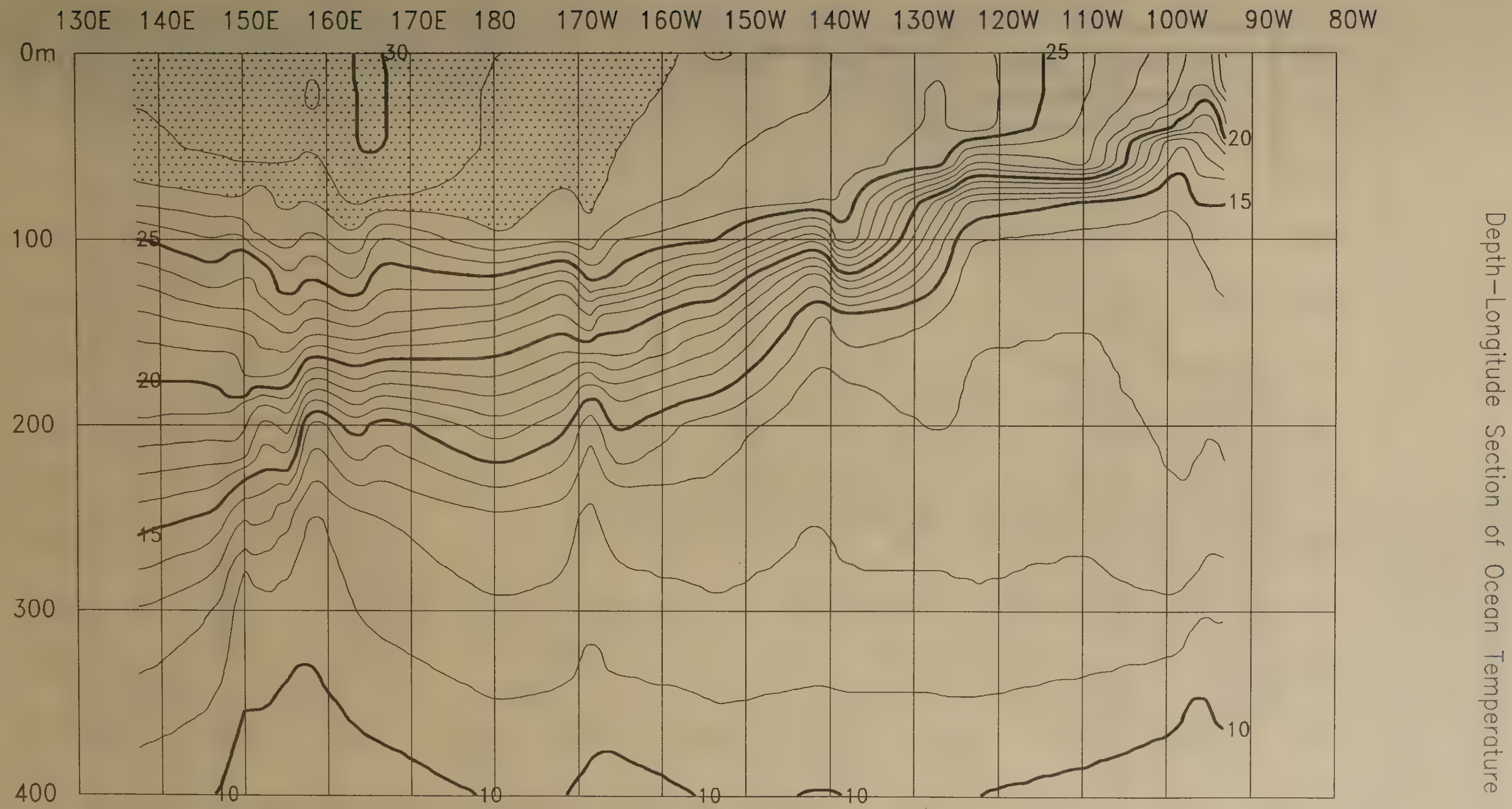
第１図　全球月平均海面水温図（上）及び偏差図（下）（1994年 7月）

Fig.1 Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for JUL 1994. Anomalies are computed with respect to the JMA climatology (1961−90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991). The Contour interval is 1° C and additional anomaly contours of ±0.5° C are shown as broken lines. Negative anomalies are stippled.

Depth of 20° C & Anomalies in the Pacific Ocean

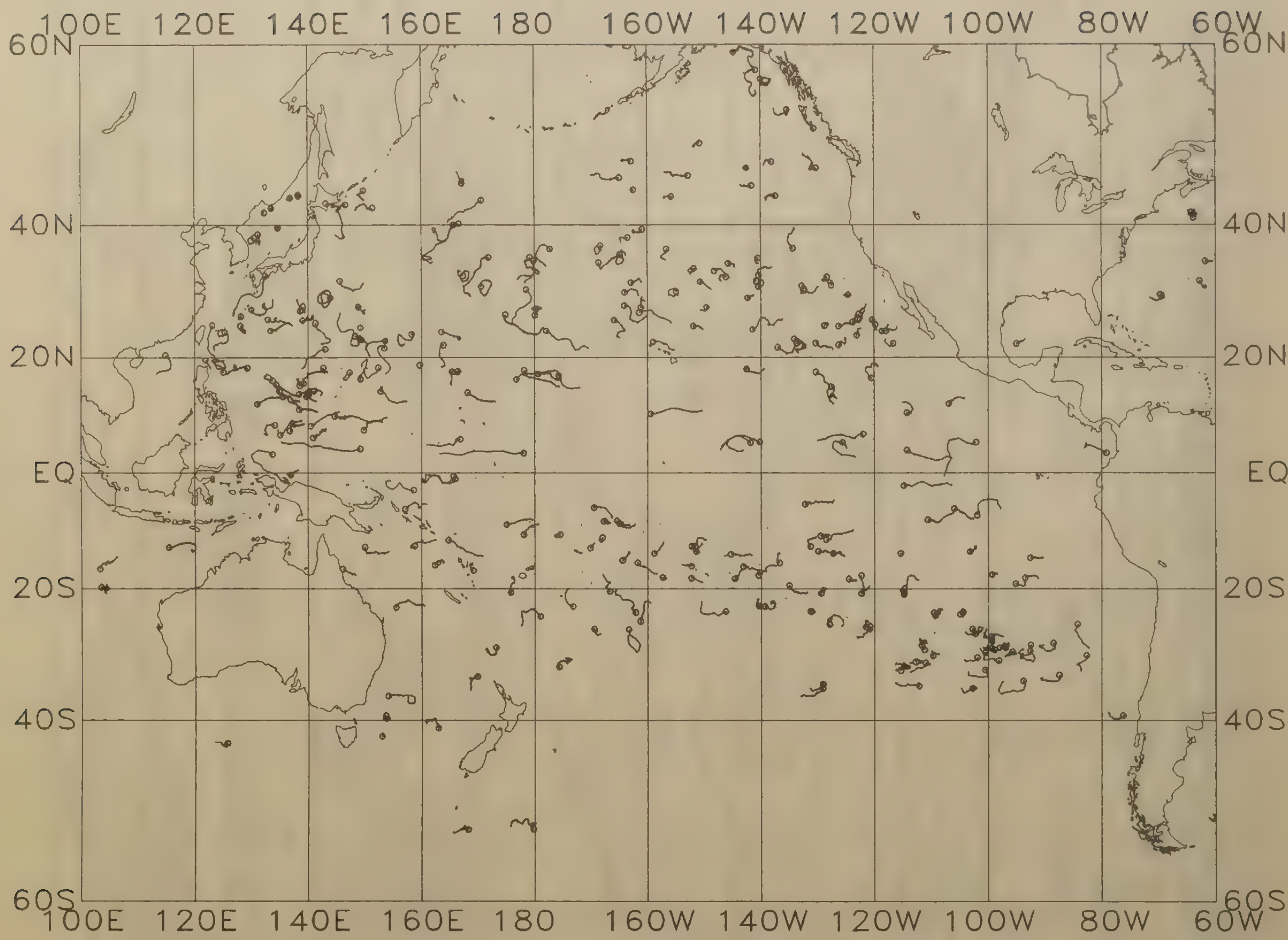


第２図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1994年 7月）
Fig.2　The depth of a 20° C isotherm in the Pacific Ocean (top) and anomalies (bottom) for JUL 1994.　Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA).
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).



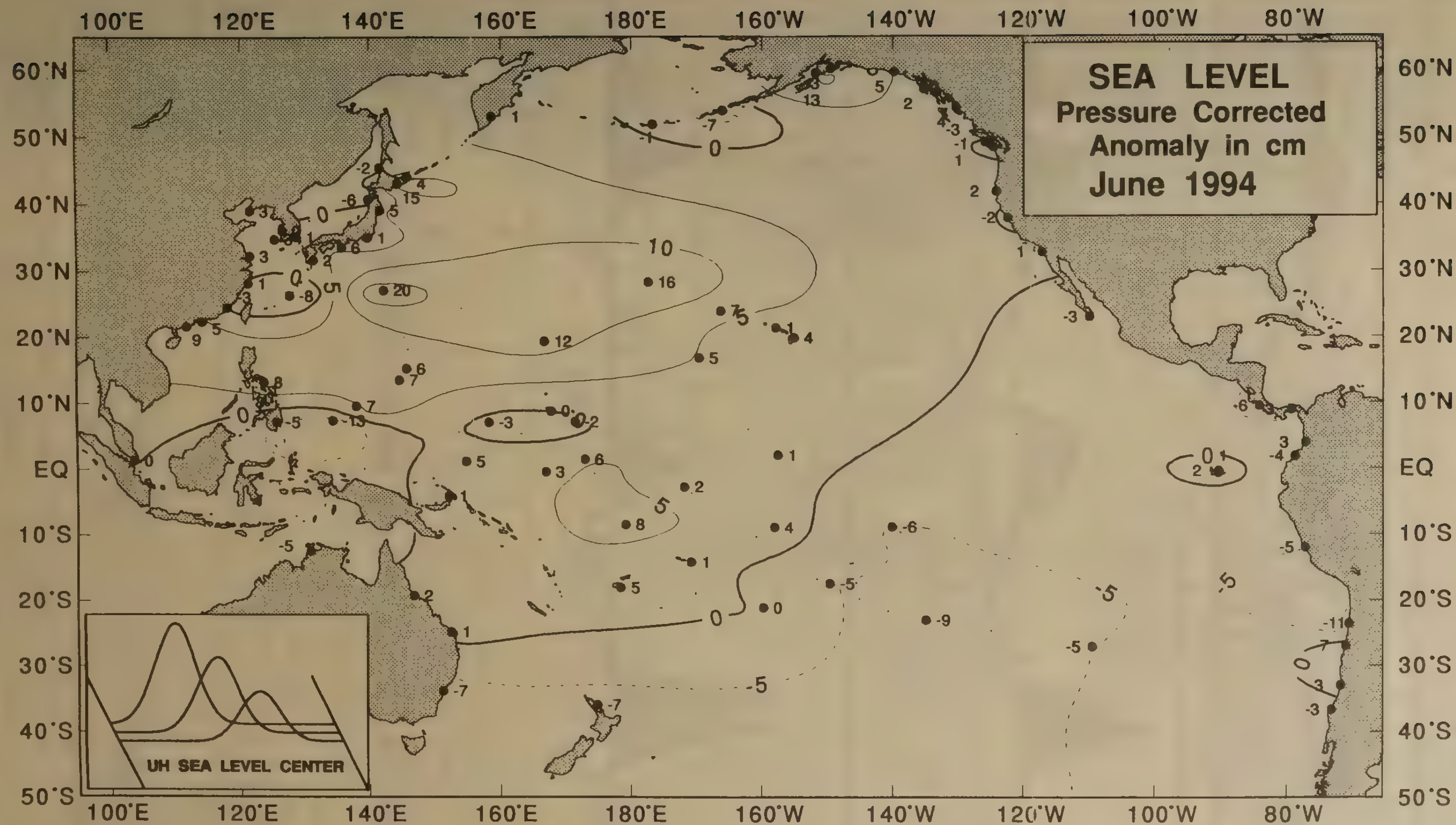
第３図　太平洋赤道に沿う表層水温断面図（1994年 7月）

Fig.3 Depth−longitude section of the Pacific Ocean temperature along the equator for JUL 1994. The contour interval is 1° C with spotted shading for values greater than 28° C.



第4図　太平洋ブイ流跡図(1994年 7月)

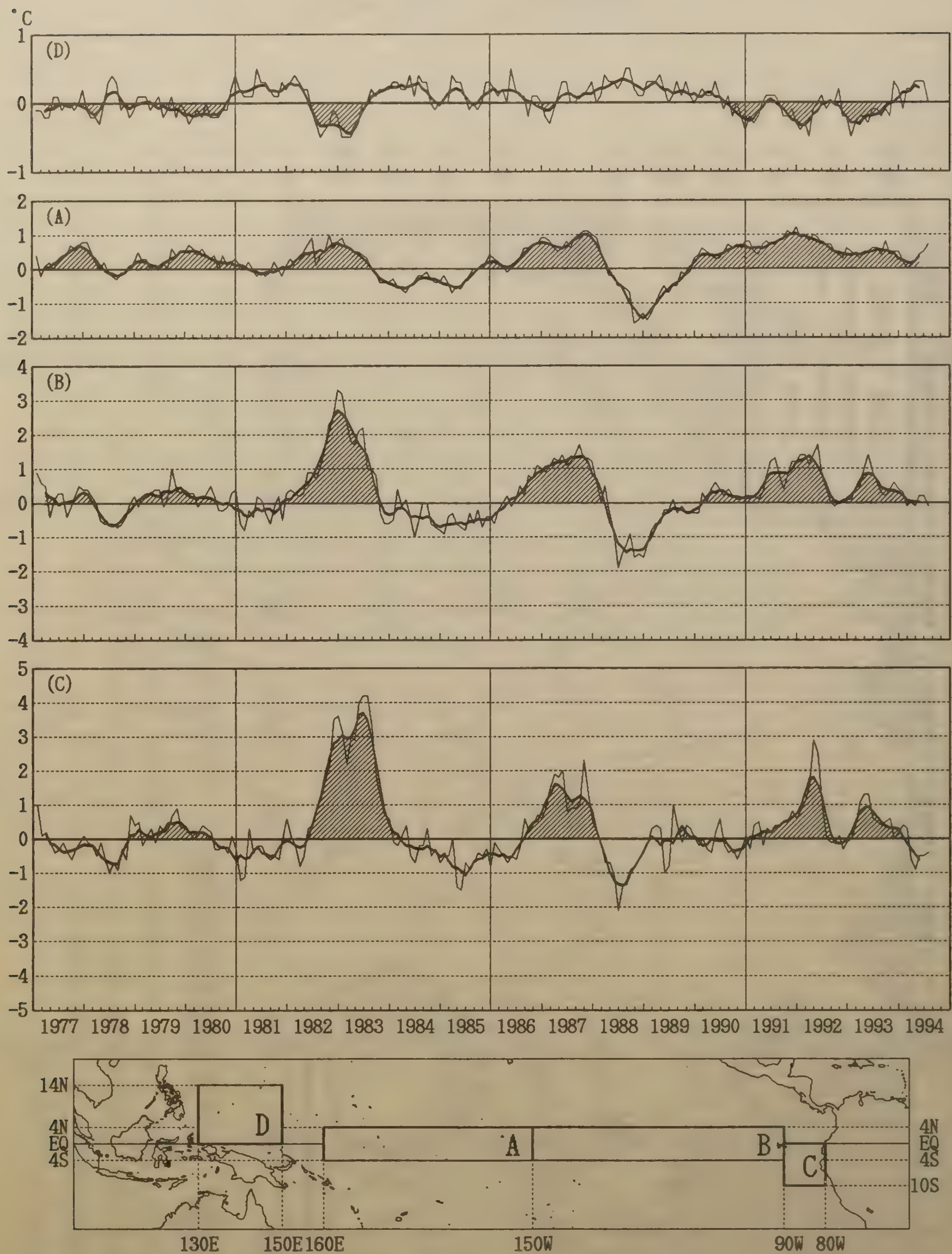
Fig.4 Movements of drifting buoys in the Pacific Ocean during JUL 1994. Each track is one buoy, with the small circle representing the buoy's last position for the month.



第5図　太平洋海面水位偏差図（ 1994年 6月 ）

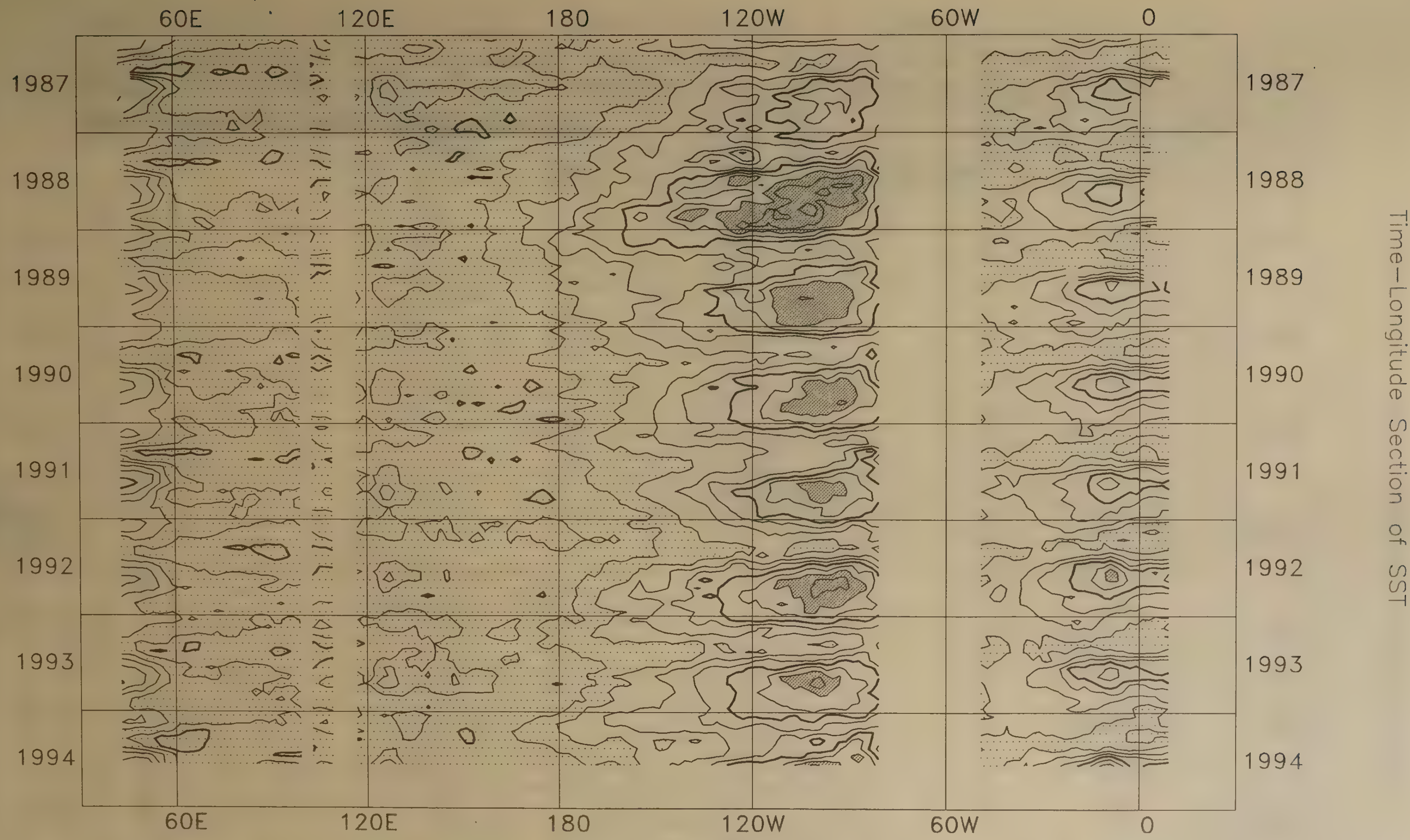
Fig.5　Sea level anomalies obtained from the 1975 to 1986 mean JUN sea level adjusted for atmospheric pressure (JUN 1994).
This figure is prepared by the SOC of ISLP–PAC, Dept. of Oceanography, Univ. of Hawaii.

Time Series of Equatorial Pacific SST Anomalies



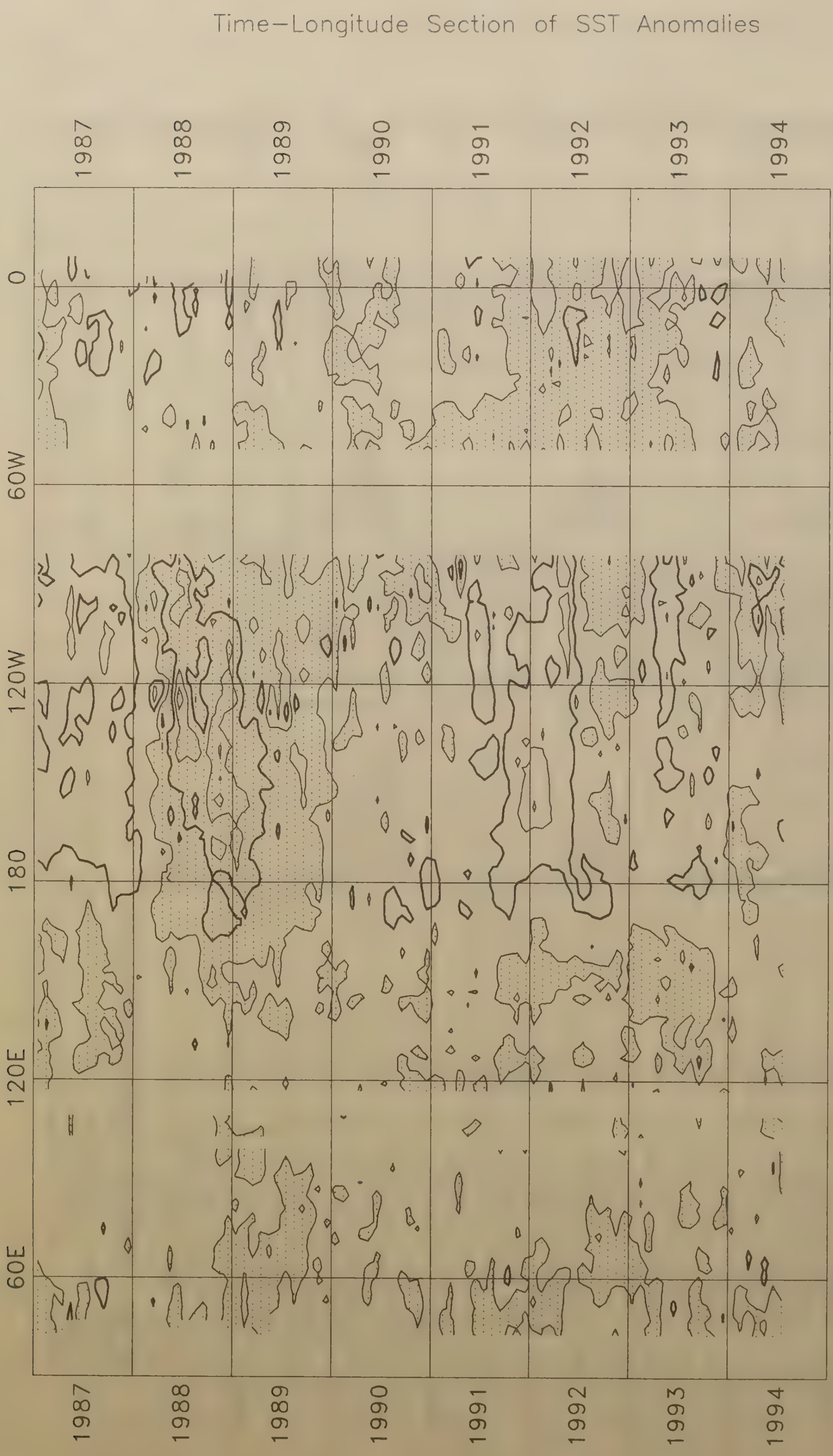
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



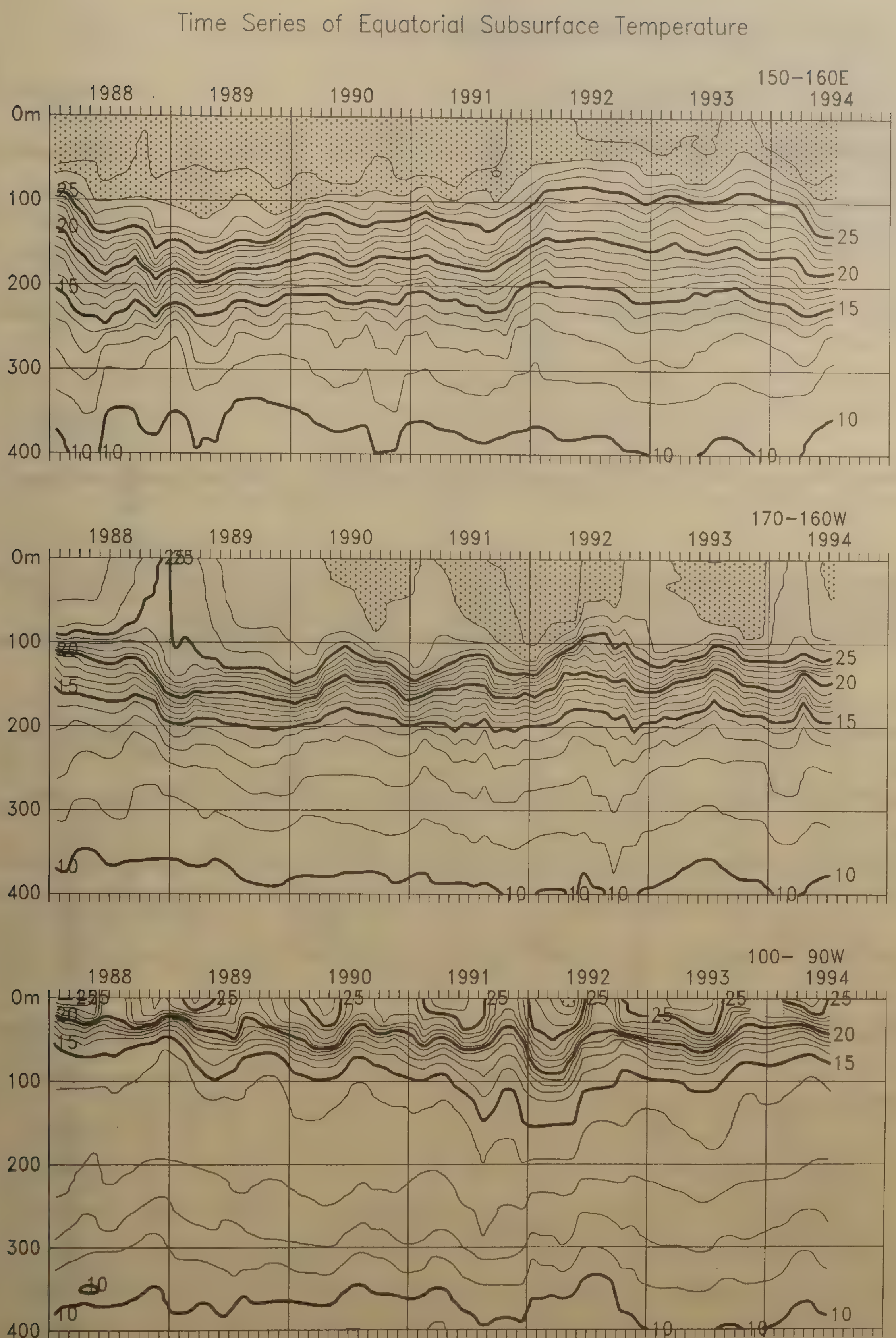
第7図　赤道に沿う海面水温時系列図

Fig.7 Time–longitude section of SSTs along the equator (2° N–2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



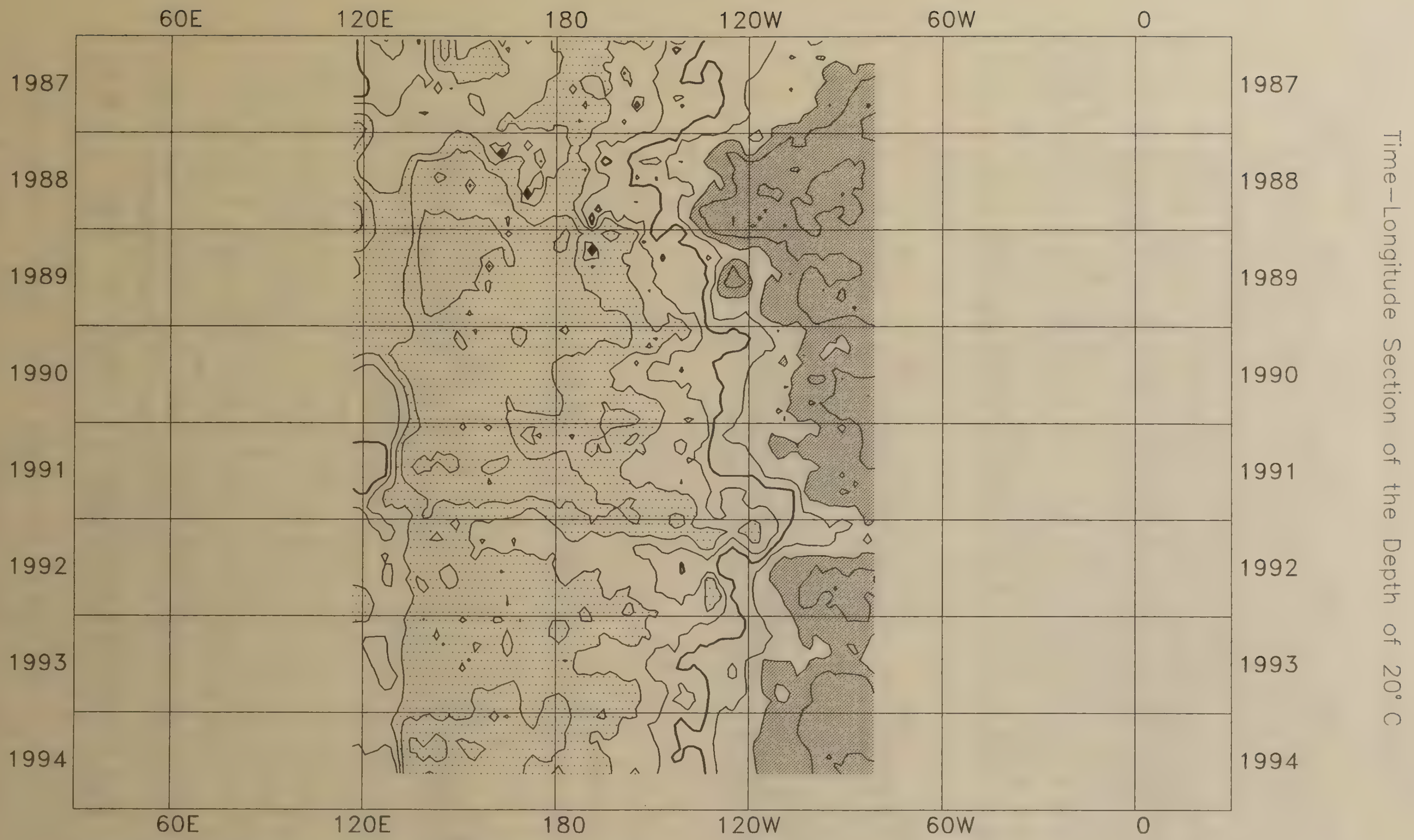
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time−longitude section of SST anomalies along the equator (2° N−2° S) based on the JMA climatology (1961−1990). The contour interval is 1° C, with thick contour lines at +1° C and −1° C. Negative anomalies are spotted.



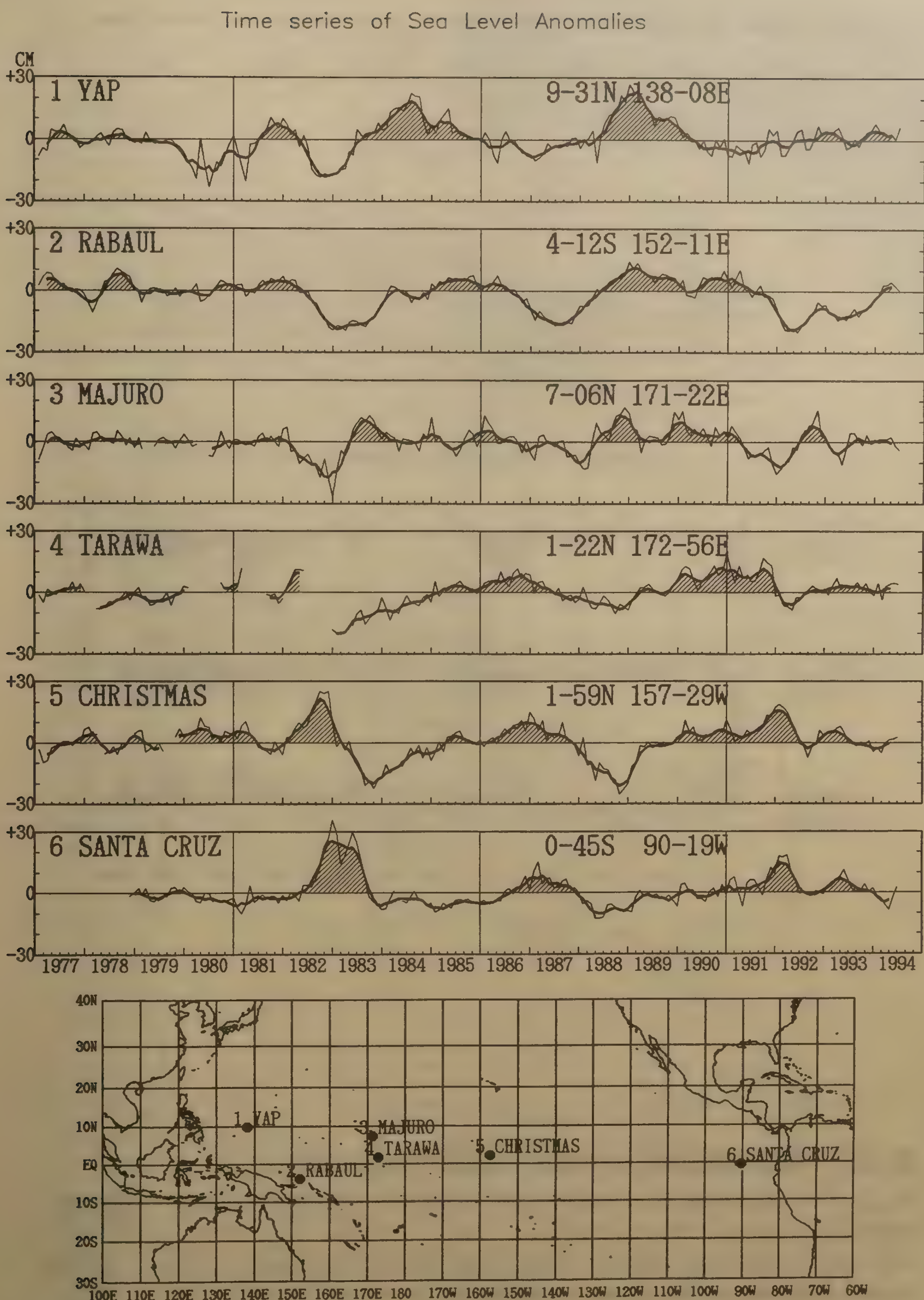
第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

Fig.9 Time series of equatorial (2° N–2° S) subsurface temperature for the western Pacific (top, 150–160° E), the central Pacific (middle, 170–160° W) and the eastern Pacific (bottom, 100–90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.



第10図　太平洋の赤道に沿う20℃深度時系列図

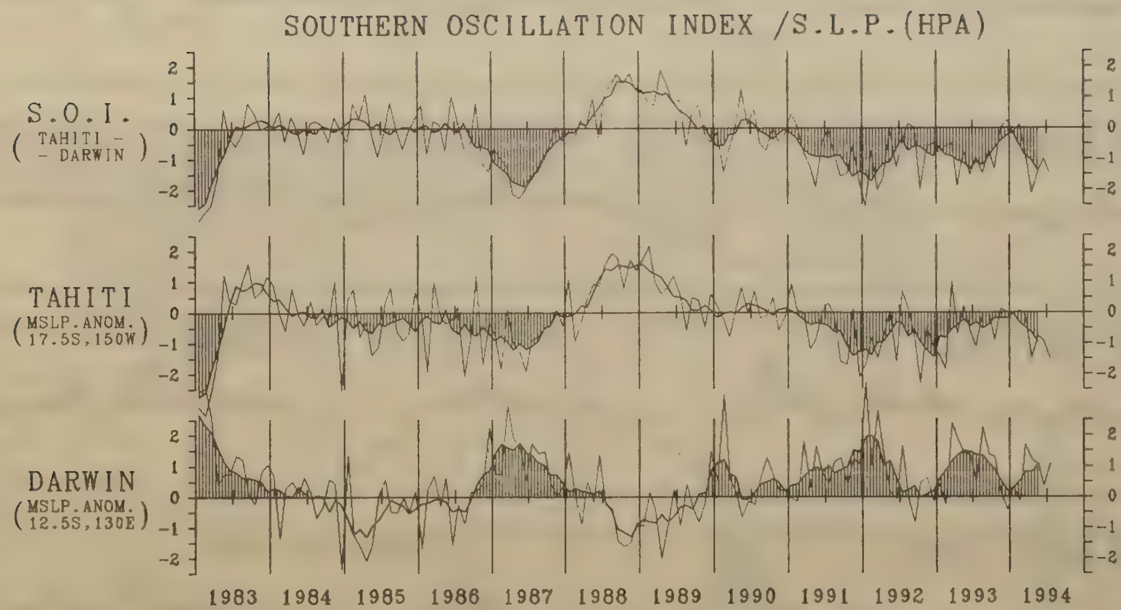
Fig.10 Time-longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

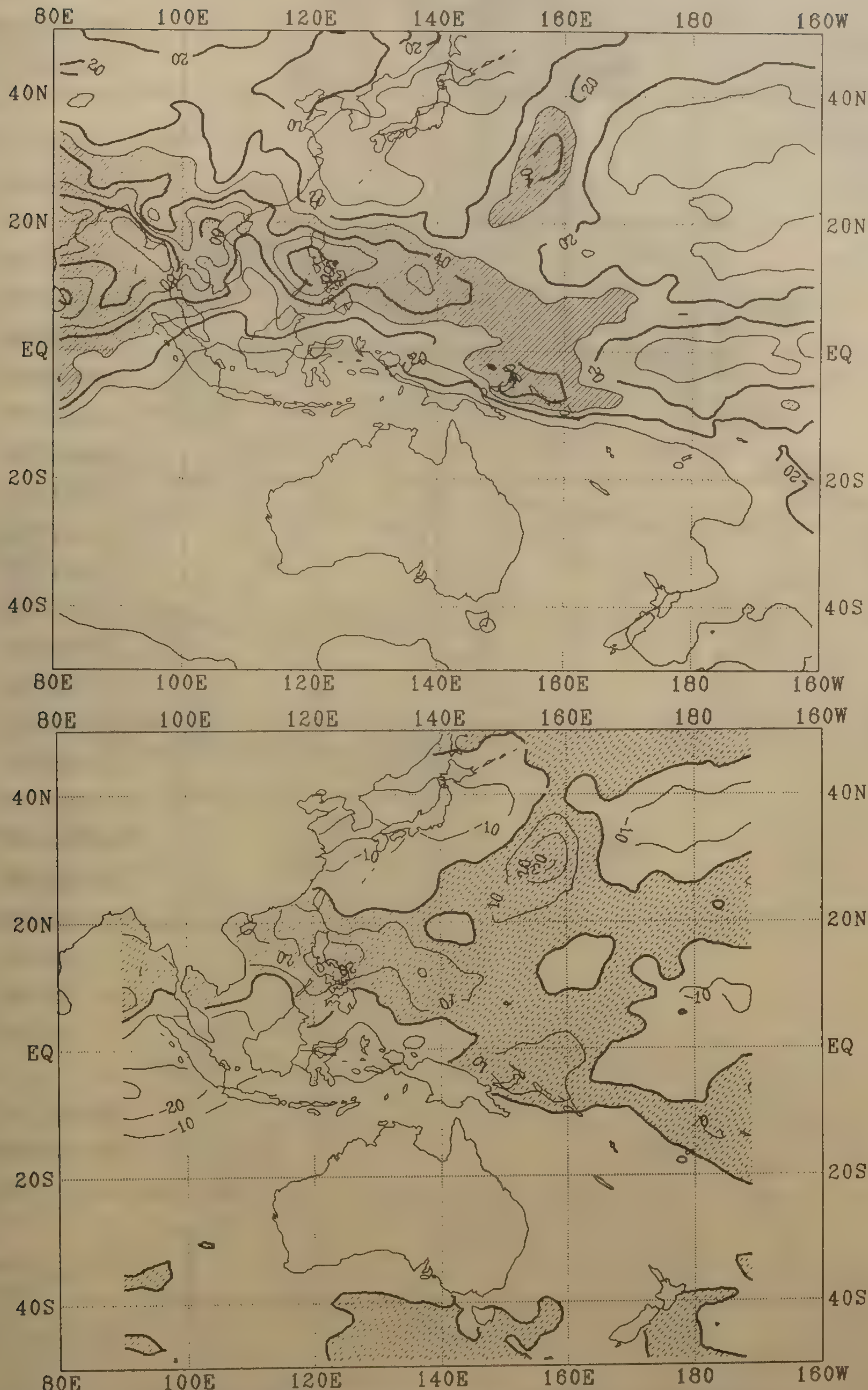
Time series of SOI & Sea Level Pressure Standardized Anomalies



第12図　南方振動指数及び海面気圧偏差時系列図

Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961–1990. This figure is prepared by the Long-range Forecast Division, JMA.

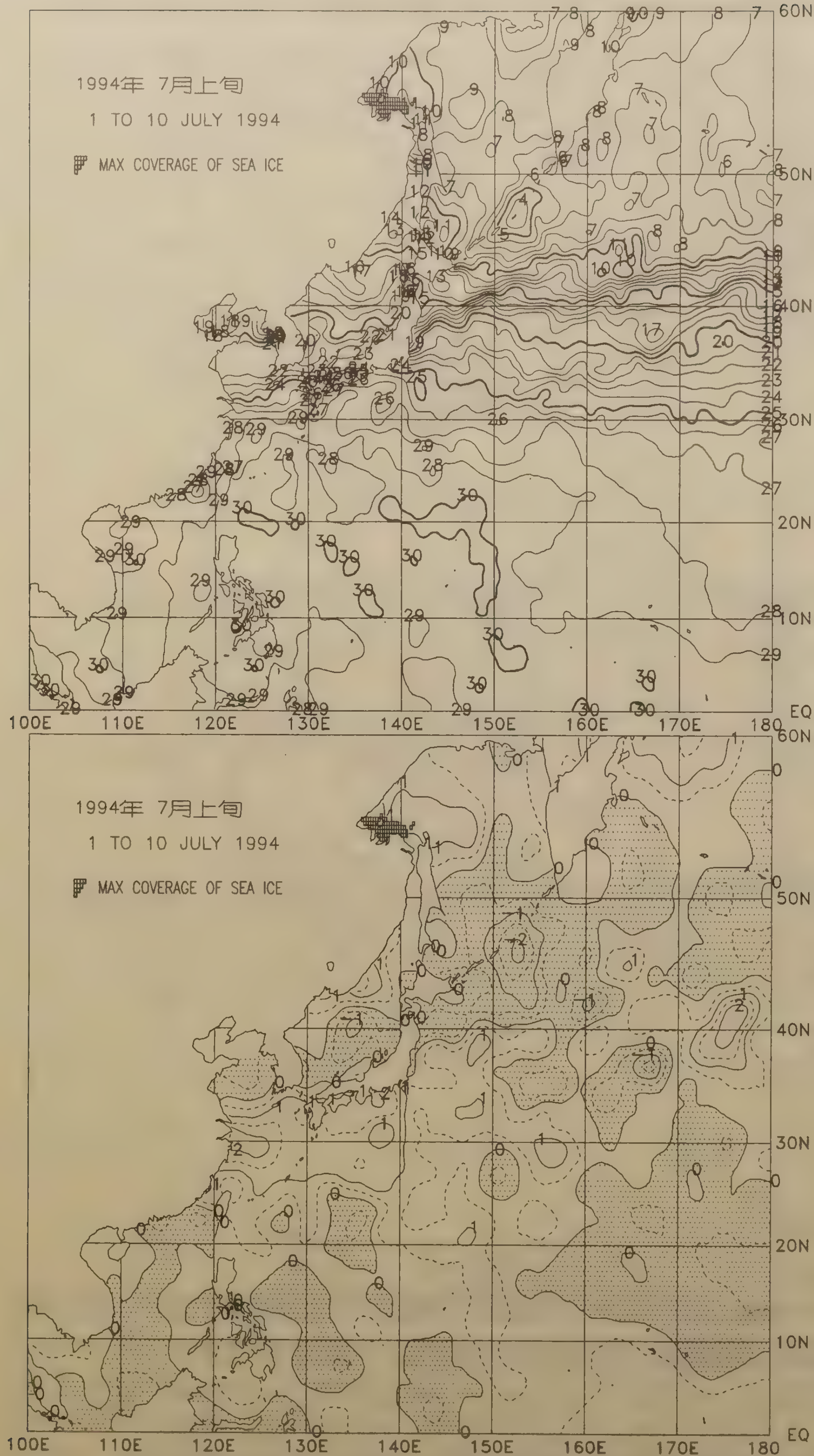
High-Cloud Amount & Anomalies



第13図　月平均上層雲量分布図及び偏差図（1994年 7月）

Fig.13 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for JUL 1994. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978-1990 base period monthly means. This figure is prepared by the Long-range Forecast Division, JMA.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	30.1	+1.2
那　覇(47936)	28.3	+1.0
名　瀬(47909)	-	-
足摺岬(47898)	24.4	+0.6
潮　岬(47778)	26.0	-
御前崎(47655)	23.4	+0.3
八丈島(47678)	25.4	+1.4
館　山(47672)	22.8	+1.4
小名浜(47598)	16.8	−0.5
宮　古(47585)	14.2	0.0
浦　河(47426)	11.9	−1.1
紋　別(47435)	14.3	-
稚　内(47401)	14.8	-
寿　都(47421)	16.1	-
江　差(47428)	17.4	-
飛　島(47587)	21.1	+0.1
輪　島(47600)	22.7	+0.5
西　郷(47740)	21.3	-
浜　田(47755)	24.8	-
厳　原(47800)	21.4	-
牛　深(47838)	22.8	-

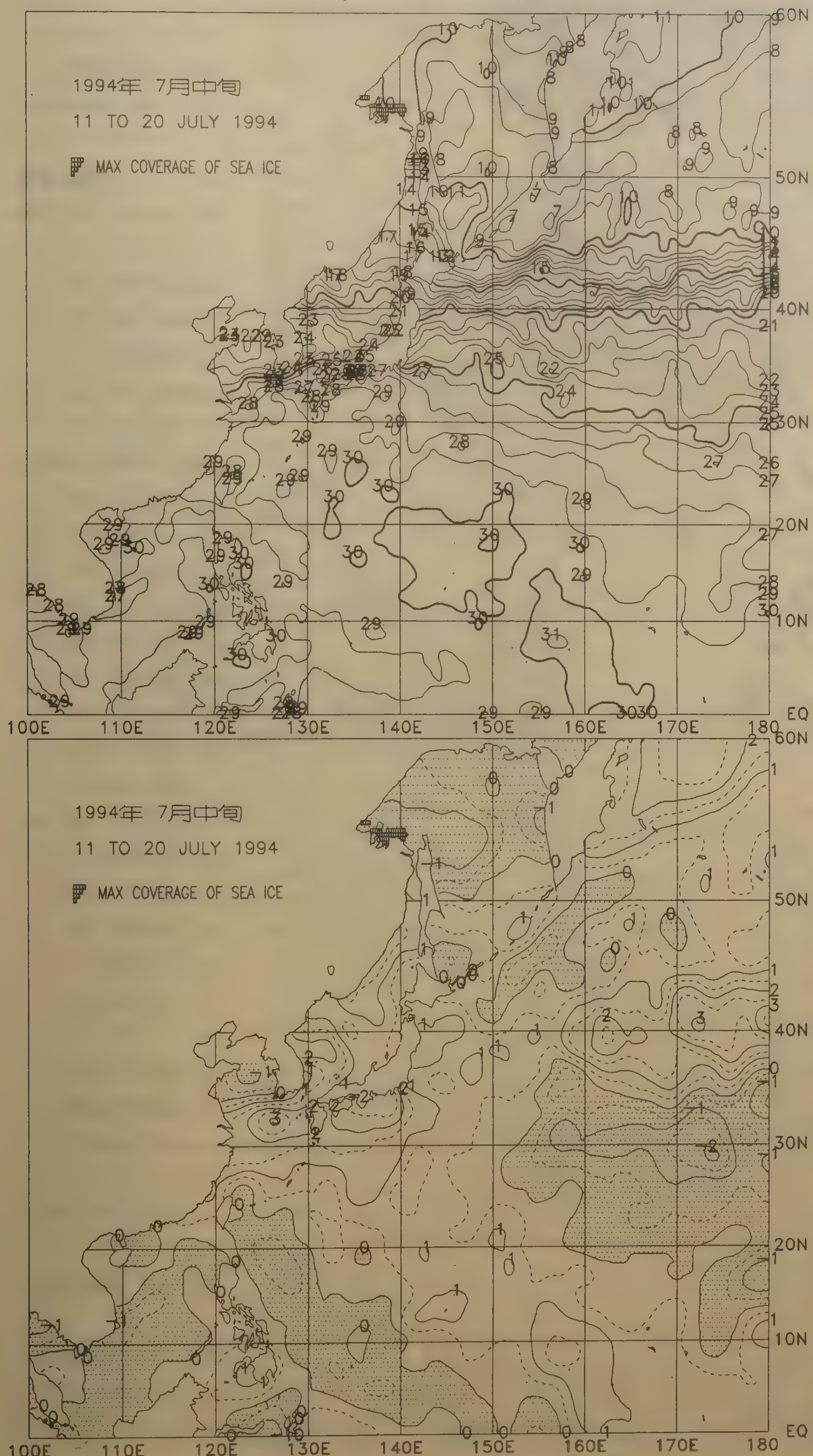
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	20.6
四国沖	29.0N,135.0E	28.1
東シナ海	28.2N,126.3E	30.2

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 7月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in JUL 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

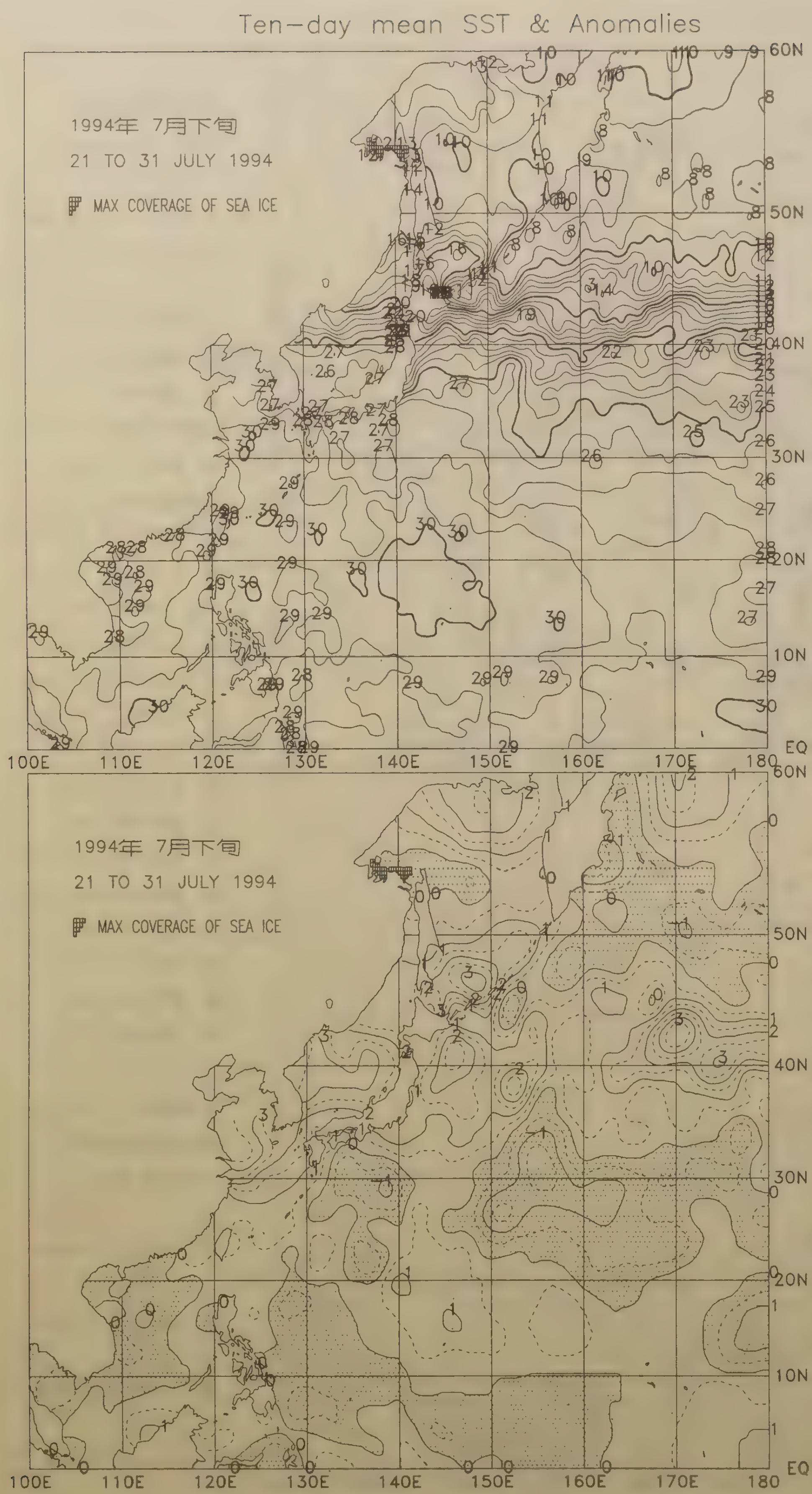
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	29.7	+0.5
那 覇(47936)	28.8	+1.4
名 瀬(47909)	−	−
足摺岬(47898)	27.1	+2.3
潮 岬(47778)	28.9	−
御前崎(47655)	26.4	+2.3
八丈島(47678)	25.7	+0.9
館 山(47672)	23.7	+2.1
小名浜(47598)	19.0	+1.0
宮 古(47585)	16.6	+1.5
浦 河(47426)	14.1	−0.4
紋 別(47435)	16.1	−
稚 内(47401)	16.7	−
寿 都(47421)	18.0	−
江 差(47428)	19.2	−
飛 島(47587)	25.6	+3.2
輪 島(47600)	25.8	+2.4
西 郷(47740)	24.3	−
浜 田(47755)	27.6	−
厳 原(47800)	25.3	−
牛 深(47838)	24.3	−

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	24.0
四国沖	29.0N,135.0E	29.5
東シナ海	28.2N,126.3E	30.1

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 7月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in JUL 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

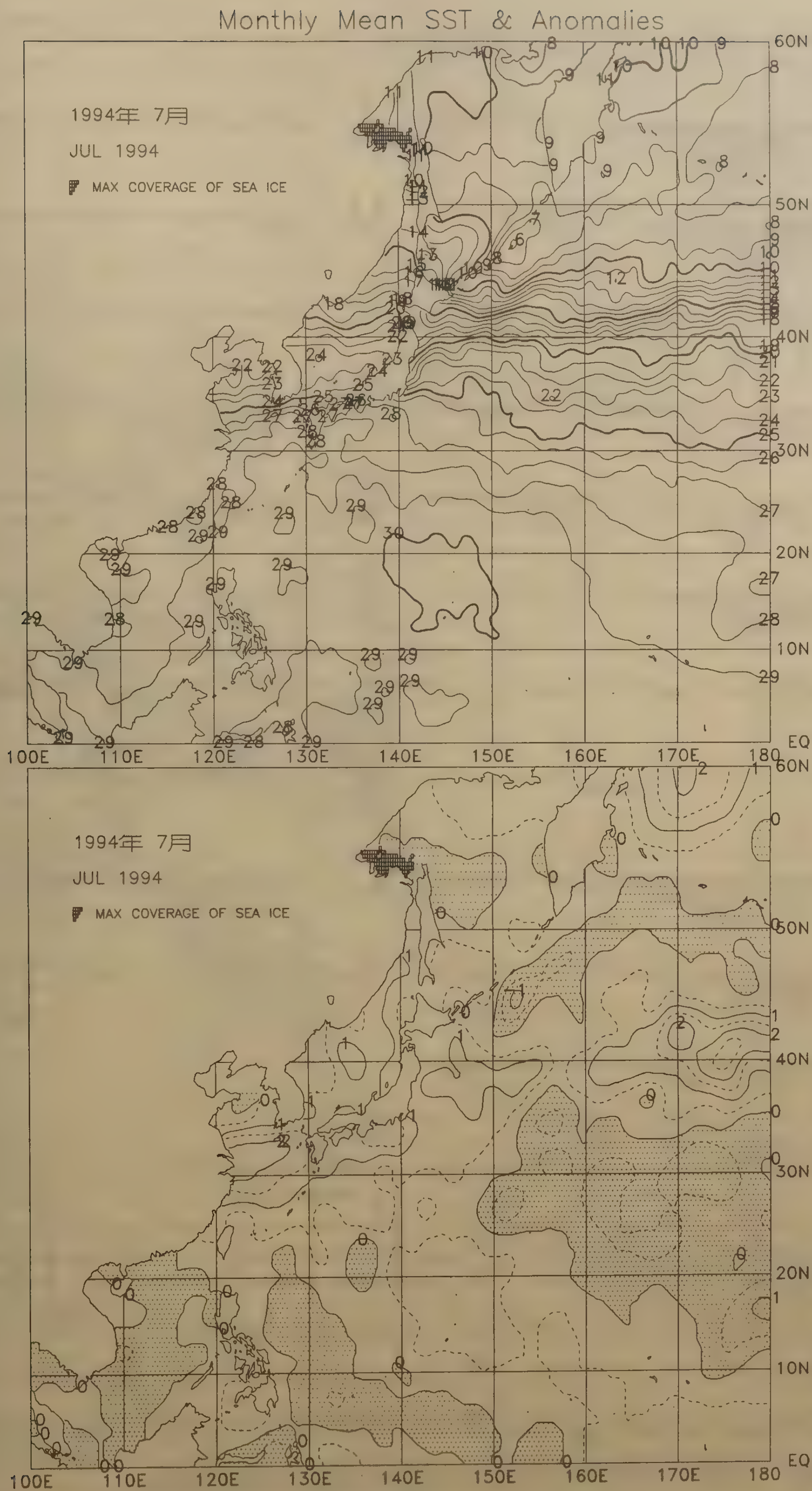
地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	30.3	+1.1
那　覇(47936)	29.2	+1.2
名　瀬(47909)	-	-
足摺岬(47898)	27.0	+0.9
潮　岬(47778)	28.3	-
御前崎(47655)	27.4	+2.0
八丈島(47678)	26.9	+1.1
館　山(47672)	25.8	+2.5
小名浜(47598)	20.1	+0.3
宮　古(47585)	19.2	+2.5
浦　河(47426)	17.8	+1.7
紋　別(47435)	18.5	-
稚　内(47401)	18.2	-
寿　都(47421)	19.4	-
江　差(47428)	21.8	-
飛　島(47587)	26.5	+1.9
輪　島(47600)	26.9	+1.2
西　郷(47740)	27.2	-
浜　田(47755)	26.1	-
厳　原(47800)	27.9	-
牛　深(47838)	25.9	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	27.0
四国沖	29.0N,135.0E	27.4
東シナ海	28.2N,126.3E	30.5

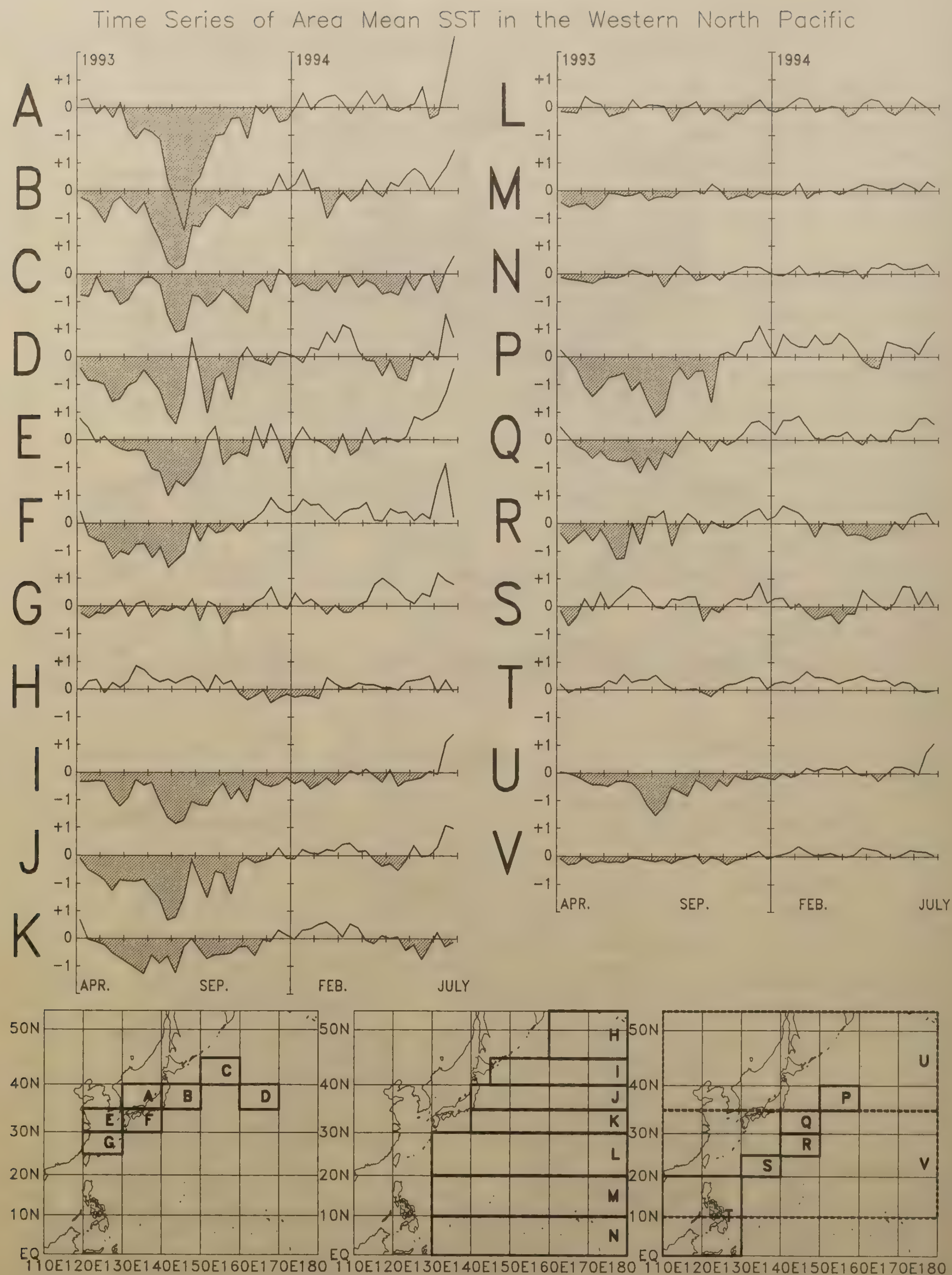
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 7月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in JUL 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



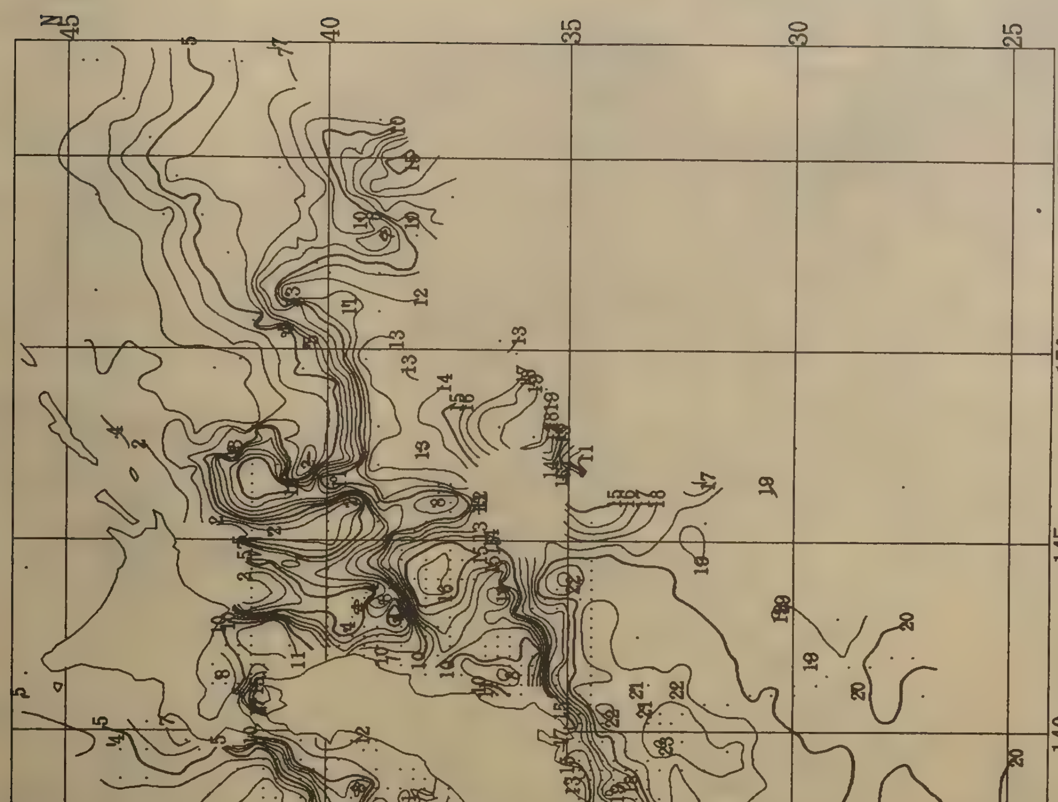
第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1994年 7月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for JUL 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.

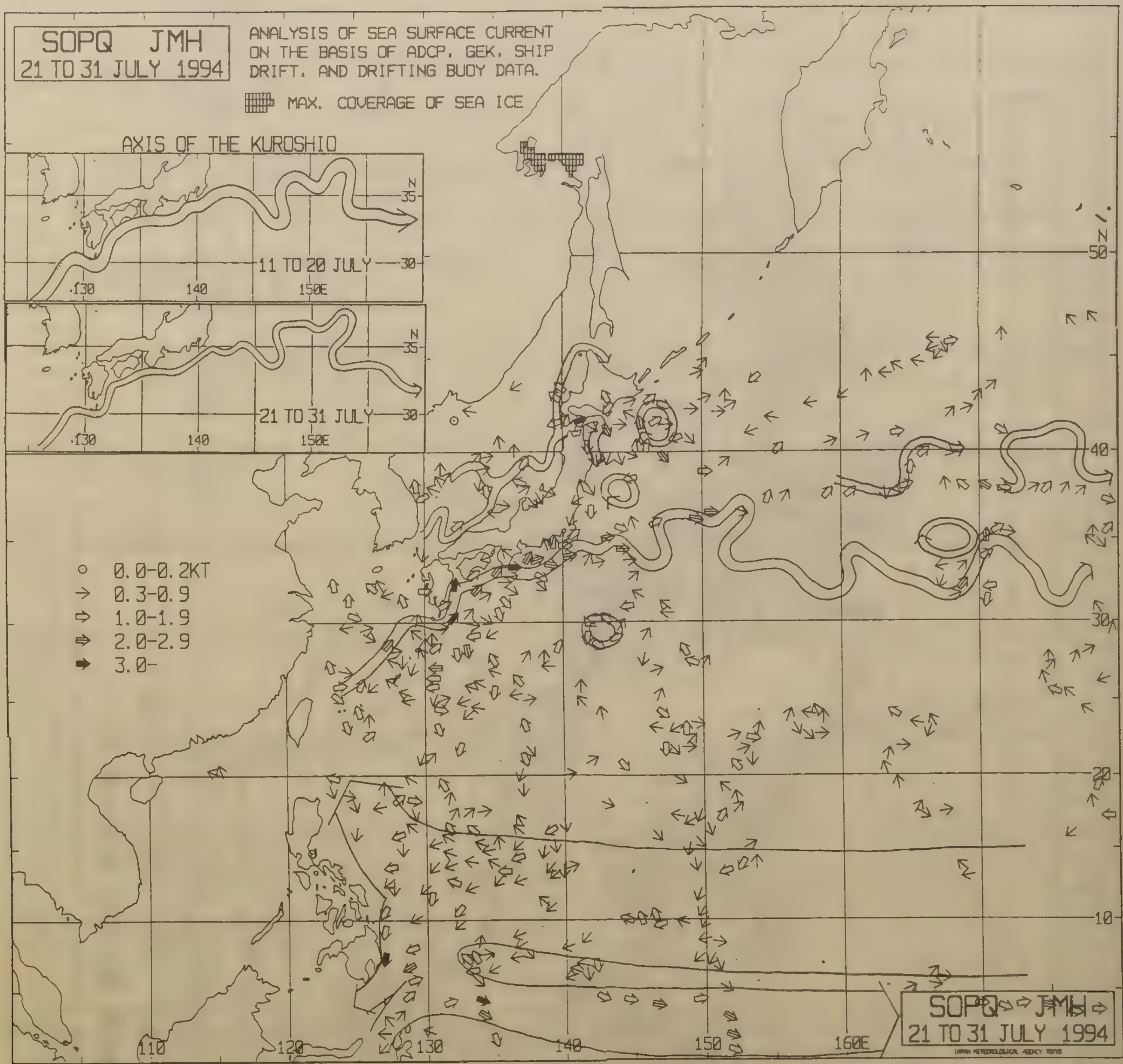


第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten-day mean sea surface temperature anomalies (° C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).

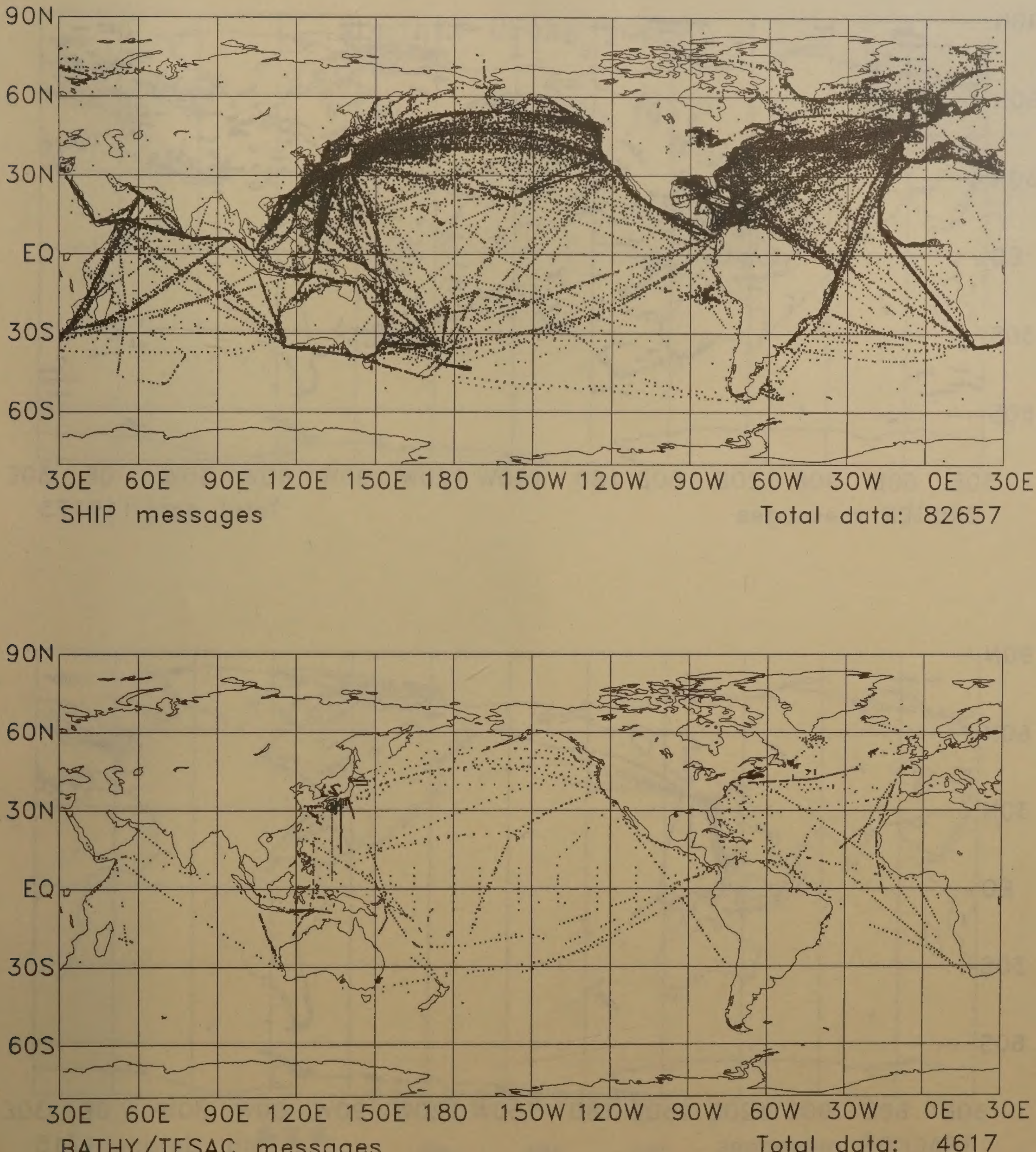


第19図　日本近海表層水温（深さ100M）図（1994年 7月）
Fig.19　Subsurface (100m) temperatures in seas adjacent to Japan for JUL 1994.



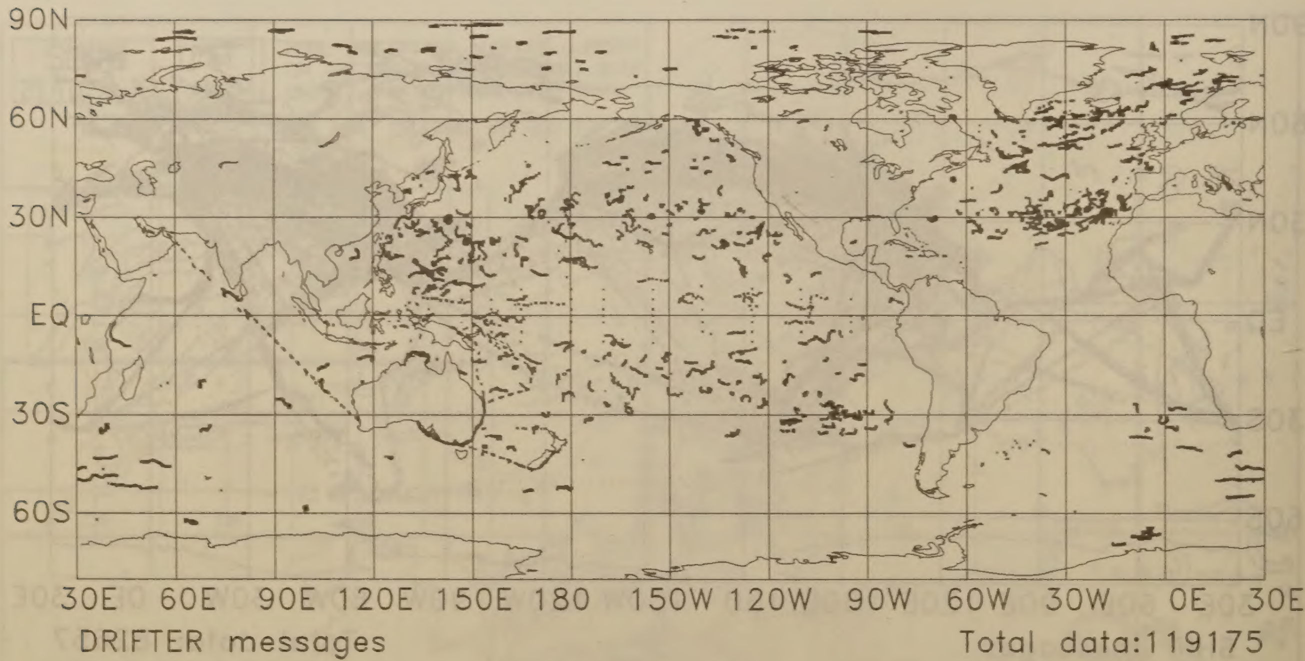
第20図　北西太平洋旬平均海流図（1994年 7月下旬）

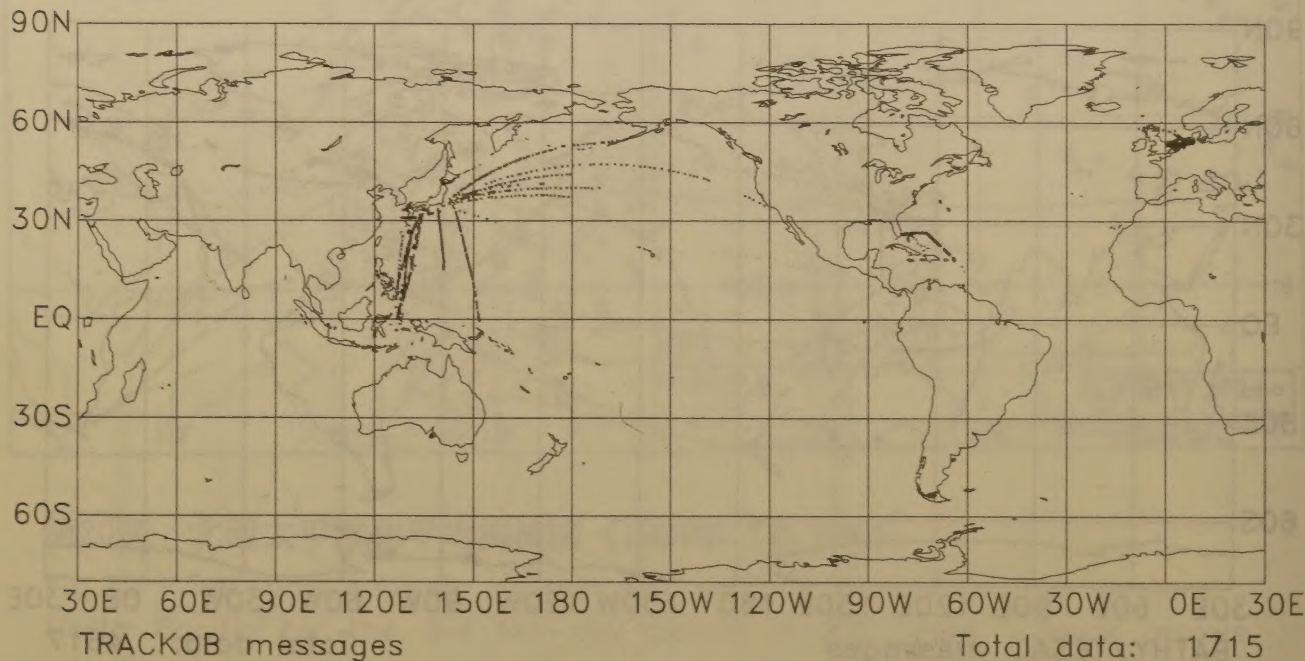
Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in JUL 1994. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.



第21-1図　測点分布図(1994年 7月)

Fig.21−1　Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for JUL 1994.





第21-2図　測点分布図(1994年 7月)

Fig.21-2 Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for JUL 1994.

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